United States
Environmental Protection
Agency

EPA/600/F-99/005
September 2000
http://www.epa.gov/ORD/NRMRL

Office of Research and Development (MD-235)

National Risk Management Research Laboratory

Providing Solutions for a Better Tomorrow

Mission

As part of the U.S. Environmental Protection Agency's Office of Research and Development, the National Risk Management Research Laboratory (NRMRL) conducts research into ways to prevent and reduce pollution risks that threaten human health and the environment. The laboratory investigates methods to prevent and control pollution to air, land, and water, and to restore ecosystems. The goals of this research are to:

(1) develop and promote technologies that protect and improve the environment;

(2) develop scientific and engineering information to support regulatory and policy decisions; and

(3) provide technical support and information transfer to ensure implementation of environmental regulations and strategies at the national and community levels.

In addition, NRMRL collaborates with both public and private sector partners to foster technologies that reduce the cost of compliance and to anticipate emerging problems.

Research

NRMRL has research facilities at its headquarters in Cincinnati, Ohio, and at its locations in Research Triangle Park, North Carolina; Ada, Oklahoma; and Edison, New Jersey. NRMRL's Technology Coordination Staff, based in Washington, D.C., manages the Environmental Technology Verification Program. NRMRL's staff includes several hundred scientists and engineers devoted to solving a wide range of environmental problems. Information follows about NRMRL's eight key research areas that support EPA's mission.

Drinking Water Protection

The U.S. has one of the safest public drinking water supplies in the world. However, current and future challenges — like the emergence of new waterborne diseases, varying source water quality, and increased contamination of ground water — must be met with well-focused research activities. NRMRL's researchers develop, investigate and improve ways to: (1) remove contaminants such as disease-causing microorganisms and arsenic from source water, and (2) control such risks as high sediment content and disinfection by-products in treatment and distribution systems. By responding to calls for technical assistance at sites of waterborne disease outbreaks, NRMRL researchers help mitigate the outbreaks while gaining insight into the need for new or modified treatment technologies. Innovative small system technologies such as ultrafiltration (UF) membranes and on-site disinfectant generation are being evaluated for their capability to remove or inactivate pathogens such as *Cryptosporidium*.

Air Pollution Control

To reduce risks posed by air pollution to human health and the environment, NRMRL researchers develop, refine, and demonstrate cost-effective air pollution prevention and control technologies for manufacturing and processing industries, power plants, incinerators, indoor environments, and sources of greenhouse gases. NRMRL is focusing its air pollution control research on reducing the quantity and toxicity of emitted air pollutants. For example, by investigating the formation mechanisms of fine particulate matter, NRMRL researchers may be able to modify combustion processes to reduce particulate matter toxicity. NRMRL's research on mercury emissions is providing decisionmakers with improved data on cost and performance of control technologies and prevention options.

Pollution Prevention

Research at NRMRL helps to develop and demonstrate pollution prevention and recycling approaches as well as resources recovery and reuse technologies. Over the last several years, NRMRL research has been expanded to include "green chemistry" projects where investigators are exploring the substitution of cost-effective, ecologically-friendly processes for traditional chemical processes. NRMRL engineers continue to design and refine software that enables manufacturers to make process changes that can improve environmental performance. One such software tool works in concert with commercial process simulators to enable design of processes and solvent mixtures with the least adverse environmental impact. Membrane and adsorption processes are also being studied by NRMRL researchers to improve recovery of reusable chemicals and metals from manufacturing and mining waste streams.

Sustainability

From pollution prevention research, sustainability and sustainable development have evolved in NRMRL as new research topics in their own right. Sustainability is the planning and use of resources in communities so that they will be available at equal or greater levels for future generations. Sustainable development is the approach that a community chooses to implement in an effort to remain sustainable. NRMRL researchers are studying and developing tools that facilitate sustainability; beyond this, they are reviewing the results of application of the tools and practices at the community level through community-based environmental protection (CBEP) programs. Pollution prevention solutions — material and energy efficient technologies viewed from a life cycle perspective (i.e., resource use and environmental impacts of the entire life-span of a product) — will be essential to meeting sustainable development goals. Applying these principles to community-based projects provides local decisionmakers and stakeholders more powerful tools to assess the impacts of local decisions before they are implemented.

Contaminated Media Remediation

To help clean up the more than one thousand hazardous waste sites that are currently on the National Priorities List, as well as leaking underground storage tanks, oil spills and sediments, NRMRL is developing tools and technologies to understand and remediate contaminants. For example, NRMRL researchers are developing models to assess fate, transport, and transformation rates of contaminants in soil and ground water. NRMRL scientists and engineers are also demonstrating methods for containment and remediation of contaminants from these sites. *Biological* methods being investigated include the use of microorganisms and plants to degrade or take up contaminants in soils and groundwater. *Chemical* methods include the use of additives to bind with and reduce the danger of metals in soil. Chemical methods are being combined with *physical* methods to treat and control contaminants in soil, sediments and groundwater. NRMRL researchers are also evaluating how natural attenuation – the use of natural processes to break down or capture contaminants – can be combined with intensive monitoring to provide cost effective site clean-up that meets regulatory requirements.

Watershed Management and Restoration

Watersheds are large-scale natural drainage areas that generally include lakes, rivers, wetlands, and other water bodies and the surrounding landscape. Watershed-scale problems often entail combined impacts to land, water, and air resources and require a coordinated effort, based on sound science, by many researchers and involved stakeholders. Recognizing the multifaceted nature of watershed problems, NRMRL scientists and engineers are using a holistic approach that draws upon many programs to carry out watershed research and develop watershed best management practices. Such practices include pollution prevention and control, on-site sediment remediation technologies, urban storm water management approaches, and combined sewer overflow treatment and control systems. Computer models and decision support systems are being developed by NRMRL to assist watershed managers and communities with ecosystem management and restoration projects.

Environmental Technology Verification (ETV)

The Environmental Technology Verification Program — or ETV — was initiated to verify the performance and cost of innovative technical solutions to problems that threaten human health or the environment. Managed as part of the President's Environmental Technology Initiative, ETV has substantially accelerated the availability of new environmental technologies into the domestic and international marketplace. The Program supplies technology buyers, innovation developers, consulting engineers, states, and EPA regions with high-quality data on the performance and cost of new technologies. This will allow more rapid protection of

the environment with better and less expensive approaches. ETV has initiated 12 pilot programs that draw on the expertise of partner organizations to design efficient processes for conducting tests of new technologies with EPA oversight. Partners are selected from both the public and private sectors to perform and report verification activities based on testing and quality assurance protocols developed with input from all major stakeholder/customer groups.

Technology Transfer and Technical Support

Informing the regulated community, regulatory and permitting officials, and environmental consultants about the latest advancements in risk management approaches and decision options is vital to the success of EPA's programs. NRMRL conveys this information by producing technology transfer publications, software products, nontechnical brochures, and convening technical meetings. In addition, NRMRL scientists and engineers provide expert advice and assistance to environmental managers at all levels of government. Recent outputs have included manuals on water and wastewater treatment for small communities and on recycling and reuse of materials found at Superfund sites; and technical meetings on geographic information systems, natural attenuation, and combined and sanitary sewer overflows. NRMRL's technical operations staff provides pilot plant support to facilitate improvement of water, wastewater, and hazardous waste treatment technologies.

NRMRL Leadership

Overall leadership and scientific direction in NRMRL are provided by:

Director, E. Timothy Oppelt

Acting Deputy Director for Management, Frank T. Princiotta

Associate Director for Health, Hugh W. McKinnon, M.D.

Associate Director for Ecology, Lee A. Mulkey

Additional Information

For additional information about NRMRL and its research programs, visit the NRMRL website (http://www.epa.gov/ORD/NRMRL) or call (513) 569-7418. EPA publications can be ordered by phone by calling (800) 490-9198 or via Internet (http://www.epa.gov/ncepihom/).

NRMRL

United States
Environmental Protection Agency
Office of Research and Development
National Risk Management Research Laboratory (MD-235)
Cincinnati, OH 45268

Official Business
Penalty for Private Use $300

EPA/600/F-99/005

PRESORTED STANDARD
POSTAGE & FEES PAID
EPA
PERMIT No. G-35